Claims

1. A collimator assembly for an X-ray imaging system comprising adjustable X-ray attenuating collimator vanes that define the area of a patient to be exposed to an X-ray beam, characterised in that the collimator vanes are automatically driven under the control of an image processing apparatus to attenuate the X-ray beam to form exposure fields of chosen shape.

2. An assembly as claimed in claim 1, which comprises a combination of a standard manually driven collimator, which employs opaque collimator vanes to provide rectangular exposure fields (the "first collimator"), and the automatically-driven collimator (the "second collimator").

3. An assembly as claimed in claim 1 or claim 2, in which the X-ray transmission profile of the collimator vanes of the automatically driven collimator is selected from: uniform and opaque; partially transparent with uniform transmission; partially transparent width a linear wedge shaped transmission profile; partially transparent with an exponential transmission profile; partially transparent with a parabolic transmission profile; or partially transparent with an arbitrary transmission profile.

4. An assembly as claimed in any preceding claim, comprising partially transparent collimator vanes which are most transparent towards the centre of the X-ray field and least transparent at the edge of the X-ray field.

5. An assembly as claimed in any one of claims 1 to 3, comprising a partially transparent collimator vane which is opaque at the periphery, or within the normally exposed region, of the radiation field.

6. An assembly as claimed in any preceding claim, comprising partially transparent collimator vanes with an X-ray transmission of 2 to 10% of the normal intensity.

7. An assembly as claimed in any preceding claim, comprising collimator vane configurations selected from: two sets of opposing pairs of flat opaque material; flexible attenuating material such as lead rubber; slats of attenuating material which draw over each other; and multiple opposing collimator vanes.

8. An assembly as claimed in any preceding claim, comprising vanes with an edge profile which ensures that no gaps of high X-ray transmission appear between the vanes as they are moved.

9. An assembly as claimed in any preceding claim, comprising multiple vanes, each of which may be extended into the radiation field independently of all the others, may typically include two sets of parallel vanes, with for example 8 to 20 vanes in each set, and the sets being in opposed positions on each side of the radiation field.

10. An assembly as claimed in any preceding claim, in which the vanes of the automatically driven collimator have a varying transmission profile.

11. An assembly as claimed in any preceding claim, in which each of the vanes of the automatically driven collimator has an individual drive means to move it independently of other vanes.

12. An assembly as claimed in claim 11, in which the drive means comprises a wire drive and pulleys under the control of a d.c. or stepping motor.

13. An assembly as claimed in claim 11, in which the drive means comprises a linear actuator or solenoid.

14. An assembly as claimed in any one of claims 11 to 13, in which the drive means includes a mechanical clutch to couple mechanical power from the motor to the pulleys.

15. An assembly as claimed in any preceding claim, in which each of the vanes of the automatically driven collimator is under mechanical tension so that it must be actively driven to move across the radiation field.

16. An assembly as claimed in claim 15, in which the mechanical tension is provided by spring-loading,

17. An assembly as claimed in any preceding claim, in which an encoder is employed to ensure accurate positioning of the vanes relative to the radiation field.

18. An assembly as claimed in any preceding claim, in which the automatically driven collimator forms part of an assembly which is rotatable about the centre of the radiation field.

19. An assembly as claimed in claim 18, in which the rotation is achieved by a motor-driven cog and a circular gear surrounding the periphery of the radiation field.

20. An assembly as claimed in any preceding claim, in which each vane is driven independently to an arbitrary angle to allow field shapes selected from parallelepipeds, squares and diamonds.

21. An assembly as claimed in any preceding claim, which comprises an iris assembly created from a plurality of X-ray attenuating vanes which are each rotatable about points located outside of the normally exposed radiation field.

22. An assembly as claimed in any preceding claim, which comprises an electronic circuit to control, power and monitor the position of the individual mechanical components within the collimator.